SAP Worksheet: As Built - Final

This As Built submission has been carried out by an Authorised SAP Assessor. The Assessor has confirmed any changes from the Design Submission with the builder.

Assessor Name Mr Martin Gill (OCDEA) **Assessor Number** 1756

Client

Date Last Modified 30/03/2009

Address 16 Willingham Way, Kingston Upon Thames, Surrey, KT1 3JA

1. Overall dwelling dimensions

	Area (m^2)		Average storey height (m)		Volume (m^3)	
Ground Floor	38.24	(1a)	× 2.34	=	89.48	(1)
First Floor	38.34	(2a)	× 2.65	=	101.60	(2)
Total floor area (1a)+(2a)+(3a)+(4a)+(4b)+(4d)+(4f)+(4h) =	76.58	(5)				
Dwelling volume			(1)+(2)+(3)+(4)+(4c)+(4e)+(4g)+(4i) =		191.08	(6)

2. Ventilation rate

			m^3 per hour	
Number of chimneys	0	× 40 =	0	(7)
Number of open flues	0	× 20 =	0	(8)
Number of intermittent fans or passive vents	2	× 10 =	20	(9)
Number of flueless gas fires	0	× 40 =	0	(9a)

			Air changes per hour	
Infiltration due to chimneys, flues and fans = (7)+(8)+(9)+(9a) =	20	÷ box (6) =	0.10	(10)
If a pressurisation test has been carried out, proceed to box (19)				
Number of storeys in the dwelling	2	(11)		
Additional infiltration		[(11) - 1] × 0.1 =	N/A	(12)
Structural infiltration: *0.25 for steel or timber frame or 0.35 for masonry construction*			N/A	(13)
If suspended wooden floor, *enter 0.2 (unsealed) or 0.1 (sealed)*, else enter 0			N/A	(14)
If no draught lobby, enter 0.05, else enter 0			N/A	(15)
Percentage of windows and doors draught stripped	N/A	(16)		
Enter 100 in box (16) for new dwellings which are to comply with Building Regulations				
Window infiltration		0.25 - [0.2 × (16) ÷ 100] =	N/A	(17)
Infiltration rate		(10)+(12)+(13)+(14)+(15)+(17) =	N/A	(18)
If based on air permeability value, then [q_{50} ÷ 20] + (10) in box (19), otherwise (19) = (18)			0.47	(19)
Air permeability value applies if a pressurisation test has been done or the design air permeability is being used				
Number of sides on which sheltered			1	(20)
(Enter 2 in box (20) for new dwellings where location is not shown)				

Shelter factor	1 - [0.075 × (20)] =	0.93	(21)
Adjusted infiltration rate	(19) × (21) =	0.43	(22)
Calculate effective air change rate for the applicable case			
If balanced whole house mechanical ventilation system	air throughput (ach) =	N/A	(22a)
If balanced with heat recovery	efficiency in % allowing for in-use factor =	N/A	(22b)
a) If balanced whole house mechanical ventilation with heat recovery	(22) + (22a) × [1 – (22b) / 100] =	N/A	(23)
b) If balanced whole house mechanical ventilation without heat recovery	(22) + (22a) =	N/A	(23a)
c) If whole house extract ventilation or positive input ventilation from outside *if (22) < 0.25, then (23b) = 0.5; otherwise (23b) = 0.25 + (22)*		N/A	(23b)
d) If natural ventilation or whole house positive input ventilation from loft *if (22) ≥ 1, then (24) = (22); otherwise (24) = 0.5 + [(22)² × 0.5]*		0.59	(24)
Effective air change rate - enter (23) or (23a) or (23b) or (24) in box (25)		0.59	(25)

3. Heat losses and heat loss parameter

ELEMENT	Area (m²)		U - value		AXU (W/K)	
Windows *	11.53	×	2.44	=	28.09	(27)
Doors	1.72	×	3.90	=	6.72	(26)
Windows *	1.27	×	4.03	=	5.10	(27)
Ground Floor	38.24	×	0.79	=	30.21	(28)
Walls	73.10	×	0.80	=	58.48	(29)
Roof	38.24	×	0.15	=	5.74	(30)
Total area of elements ΣA, m²	164.10	(32)				

* *for windows and rooflights, use effective window U-value calculated as given in paragraph 3.2*

Fabric heat loss, W/K	(26)+(27)+(27a)+(27b)+(28)+(29)+(29a)+(30)+(30a)+(31) =	134.34	(33)
Thermal bridges - Σ (lxΨ) calculated using Appendix K *if details of thermal bridging are not known calculate y× (32) [see Appendix K] and enter in box (34)*		24.62	(34)
Total fabric heat loss	(33)+(34) =	158.96	(35)
Ventilation heat loss	(25) × 0.33 × (6) =	37.45	(36)
Heat loss coefficient, W/K	(35)+(36) =	196.41	(37)
Heat loss parameter (HLP), W/m²K	(37) ÷ (5) =	2.56	(38)

4. Water heating energy requirement

	kWh/year	
Energy content of hot water used from Table 1 column (b)	1801.22	(39)
Distribution loss from Table 1 column (c) *If instantaneous water heating at point of use, enter "0" in boxes (40) to (45)* *For community heating use Table 1 (c) whether or not hot water tank is present*	317.86	(40)
Water storage loss:		
a) If manufacturer's declared loss factor is known (kWh/day):	N/A	(41)
Temperature factor from Table 2b	N/A	(41a)

Energy lost from water storage, kWh/year	(41)×(41a)×365 =	N/A	(42)

b) If manufacturer's declared cylinder loss factor is not known:

Cylinder volume (litres) including any solar storage within same cylinder *If community heating and no tank in dwelling, enter 110 litres in box (43)* *Otherwise, if no stored hot water (this includes instantaneous combi boilers), enter '0' in box (43)*		N/A	(43)
Hot water storage loss factor from Table 2 (kWh/litre/day) *If community heating and no tank in dwelling, use cylinder loss from Table 2 for 50 mm factory insulation in box (44)*		0.00	(44)
Volume factor from Table 2a		0.00	(44a)
Temperature factor from Table 2b		0.00	(44b)
Energy lost from water storage, kWh/year	(43)×(44)×(44a)×(44b)×365 =	0.00	(45)
Enter (42) or (45) in box (46)		0.00	(46)
If cylinder contains dedicated solar storage, box (47) = (46) × [(43) - (H11)] / (43), else (47) = (46)		0.00	(47)
Primary circuit loss from Table 3		0.00	(48)
Combi loss from Table 3a (enter "0" if no combi boiler)		596.62	(49)
Solar DHW input calculated using Appendix H (enter "0" if no solar collector)		0.00	(50)
Output from water heater, kWh/year	(39)+(40)+(47)+(48)+(49)-(50) =	2715.70	(51)
Heat gains from water heating *include (47) in calculation of (52) only if cylinder is in the dwelling or hot water is from community heating*	0.25 × [(39)+(49)]+0.8×[(40)+(47)+(48)] =	853.75	(52)

5. Internal gains

		Watts	
Lights, appliances, cooking and metabolic (Table 5)		463.24	(53)
Reduction of internal gains due to low energy lighting (calculated in Appendix L)		53.42	(53a)
Additional gains from Table 5a		10.00	(53b)
Water heating	(52) ÷ 8.76 =	97.46	(54)
Total internal gains	(53) + (53b) + (54) - (53a) =	517.28	(55)

6. Solar gains

	Access factor Table 6d		Area m²		Flux Table 6a		g Table 6b		FF Table 6c		Gains (W)	
West	0.77	×	7.67	×	48.00	x 0.9 x	0.76	×	0.70	=	135.67	(57)
East	0.77	×	3.86	×	48.00	x 0.9 x	0.76	×	0.70	=	68.36	(59)
East	0.77	×	1.27	×	48.00	x 0.9 x	0.85	×	0.40	=	14.33	(59)

Total solar gains:	[(56) + ... + (64)] =	218.36	(65)

Note: for new dwellings where overshading is not known, the solar access factor is '0.77'

Total gains, W	(55) + (65) =	735.64	(66)

Gain/loss ratio (GLR)	(66) ÷ (37) =	3.75	(67)
Utilisation factor (Table 7, using GLR in box (67))		0.99	(68)
Useful gains, W	(66) × (68) =	729.62	(69)

7. Mean internal temperature

		° C	
Mean internal temperature of the living area (Table 8)		18.80	(70)
Temperature adjustment from Table 4e, where appropriate		0.00	(71)
Adjustment for gains *R is obtained from the 'responsiveness' column of Table 4a or Table 4d*	{[(69) ÷ (37)] - 4.0} × 0.2 ×R =	-0.06	(72)
Adjusted living room temperature	(70) + (71) + (72) =	18.74	(73)
Temperature difference between zones (Table 9)		1.66	(74)
Living area fraction (0 to 1.0)	living room area ÷ (5) =	0.20	(75)
Rest-of-house fraction	1 - (75) =	0.80	(76)
Mean internal temperature	(73) - [(74) × (76)] =	17.42	(77)

8. Degree days

Temperature rise from gains	(69) ÷ (37) =	3.71	(78)
Base temperature	(77) - (78) =	13.70	(79)
Degree-days, *use box (79) and Table 10*		1714.33	(80)

9. Space heating requirements

Space heating requirement (useful), kWh/year	0.024 × (80) × (37) =	8081.14	(81)

For range cooker boilers where efficiency is obtained from the Boiler Efficiency Database or manufacturer's declared value, multiply the result in box (81) by (1 - Φ case/Φwater) where Φ case is the heat emission from the case of the range cooker at fullload (in kW); and Φ water is the heat transferred to water at full load (in kW).Φ case and Φ water are obtained from the database record for the range cooker boiler or manufacturer's declared value.

9a. Energy requirements - individual heating systems, including micro-CHP

Note: when space and water heating is provided by community heating use the alternative worksheet 9b

Space heating:

Fraction of heat from secondary/supplementary system (*use value from Table 11, Table 12a or Appendix F)*		0.00	(82)
Efficiency of main heating system, %		78.60	(83)
(SEDBUK or from Table 4a or 4b, adjusted where appropriate by the amount shown in the 'efficiency adjustment' column of Table 4c)			
Efficiency of secondary/supplementary heating system, % (use value from Table 4a or Appendix E)		0.00	(84)
Space heating fuel (main) requirement, kWh/year	[1- (82)] × (81) ×100 ÷ (83) =	10281.35	(85)
Space heating fuel (secondary), kWh/year	(82) × (81) ×100 ÷ (84) =	N/A	(85a)

Water heating:

Efficiency of water heater, %					78.60	(86)
(SEDBUK or from Table 4a or 4b, adjusted where appropriate by the amount shown in the 'efficiency adjustment' column of Table 4c)						
Energy required for water heating, kWh/year				(51) × 100 ÷ (86) =	3455.09	(86a)
Electricity for pumps and fans:				**kWh/year**		
each central heating pump, (Table 4f)				130.00		(87a)
each boiler with a fan-assisted flue (Table 4f)				45.00		(87b)
warm air heating system fans (Table 4f)				0.00		(87c)
mechanical ventilation -balanced, extract or positive input from outside (Table 4f)				0.00		(87d)
maintaining keep-hot facility for gas combi boiler (Table 4f)				0.00		(87e)
pump for solar water heating (Table 4f)				0.00		(87f)
Total electricity for the above equipment, kWh/year				(87a)+(87b)+(87c)+(87d)+(87e)+(87f) =	175.00	(87)

10a. Fuel costs - individual heating systems

	Fuel kWh/year		**Fuel price** (Table 12)		**Fuel cost** £/year	
Space heating - main system	(85)	×	1.63	×0.01 =	167.59	(88)
Space heating - secondary	(85a)	×	N/A	× 0.01 =	0.00	(89)
Water heating						
Water heating cost (electric, off-peak tariff)						
On-peak fraction (Table 13, or Appendix F for electric CPSUs)				0.00		(90)
Off-peak fraction			1.0 - (90) =	1.00		(90a)
			Fuel price			
On-peak cost	(86a) × (90)	×	N/A	× 0.01 =	0.00	(91)
Off-peak cost	(86a) × (90a)	×	N/A	× 0.01 =	0.00	(91a)
Water heating cost (other fuel)	(86a)	×	1.63	× 0.01 =	56.32	(91b)
Pump and fan energy cost	(87)	×	7.12	× 0.01 =	12.46	(92)
Energy for lighting (calculated in Appendix L)	356.13	×	7.12	× 0.01 =	25.36	(93)
Additional standing charges (Table 12)					34.00	(94)
Renewable and energy-saving technologies (Appendices M and N)						
PV						
Energy produced or saved, kWh/year	2743.06	(95)				
Cost of energy produced or saved, £/year	(95)	×	6.41	× 0.01 =	175.83	(95a)
Wind						
Energy produced or saved, kWh/year	0.00	(95b1)				
Cost of energy produced or saved, £/year	(95b1)	×	0.00	× 0.01 =	N/A	(95b)
Micro CHP						
Energy produced or saved, kWh/year	N/A	(95c1)				
Cost of energy produced or saved, £/year	(95c1)	×	N/A	× 0.01 =	N/A	(95c)

Energy consumed by the technology, kWh/year	N/A (96)					
Cost of energy consumed, £/year	(96)	×	N/A	×0.01 =	N/A	(96a)
Special features (Appendix Q)						
Energy produced or saved, kWh/year	N/A (s1)					
Cost of energy produced or saved, £/year	(s1)	×	N/A	× 0.01 =	N/A	(s1a)
Energy consumed by the technology, kWh/year	N/A (s2)					
Cost of energy consumed, £/year	(s2)	×	N/A	×0.01 =	N/A	(s2a)

Total energy cost (88)+(89)+(91)+(91a)+(91b)+(92)+(93)+(94)-(95a)-(95b)-(95c)+(96a)-(s1a)+(s2a) = 119.89 (97)

11a. SAP rating - individual heating systems

Energy cost deflator (SAP 2005)		0.91	(98)
Energy cost factor (ECF)	{[(97) × (98)] - 30.0} ÷ {(5) + 45.0} =	0.65	(99)
SAP rating (Table 14)		91	(100)
SAP band		B	

12a. Carbon dioxide emissions rate for individual heating systems (including micro-CHP) and community heating without CHP

Individual heating system:	**Energy** kWh/year		**Emission factor** kg CO_2/kWh		**Emissions** kgCO_2/year	
Space heating main from box (85)	10281.35	×	0.194	=	1994.58	(101)
Space heating secondary from box (85a)	N/A	×	N/A	=	0.00	(102)
Energy for water heating from box (86a)	3455.09	×	0.194	=	670.29	(103)
Energy for water heating (51) or [(87b*) × 100 ÷ (104)] =	N/A	×	N/A	=	N/A	(106)
Space and water heating	[(101) + (102) + (103)] or [(105) + (106)] =				2664.87	(107)
Energy for water heating (Type 1 fraction) × (87*) × 100 ÷ (104a) =	N/A	×	N/A	=	N/A	(106a)
Energy for water heating (Type 2 fraction) × (87*) × 100 ÷ (104b) =	N/A	×	0.000	=	N/A	(106b)
Space and water heating	[(105a) + (106a) + (105b) + (106b)] =				2664.87	(107)
Electricity for pumps and fans from box (87) or (88*)	175.00	×	0.422	=	73.85	(108)
Energy for lighting from Appendix L	356.13	×	0.422	=	150.29	(109)
Energy produced or saved in dwelling (Appendices M and N)						
PV energy produced or saved (95) or (95*)		×	0.57	=	1558.06	(110)
Wind energy produced or saved (95b1) or (95b1*)		×	N/A	=	N/A	(110b)
Micro-CHP energy produced or saved (95c1) or (95c1*)		×	N/A	=	N/A	(110c)
Micro-CHP energy consumed (96) or (96*)		×	N/A	=	0.00	(111)

Energy produced or saved in dwelling (Appendix Q)	(s1) or (s1*)	×	N/A	=	0.00	(s1a)
Energy consumed by the technology (Appendix Q)	(s2) or (s2*)	×	N/A	=	0.00	(s2a)
Total CO_2 kg/year	(107) + (108) + (109) - (110) + (111) - (s1a) + (s2a)			=	1330.95	(112)
Carbon dioxide emissions rate	(112) ÷ (5)			=	17.38	(113)
EI rating					85	
EI band					B	

13a. Primary energy, for individual heating systems (including micro-CHP) and community heating without CHP

Individual heating system:	**Energy** kWh/year		**Primary energy factor**		**Primary energy** (kWh/year)
Space heating main from box (85)	10281.35	×	1.150	=	11823.55
Space heating secondary from box (85a)	N/A	×	N/A	=	0.00
Energy for water heating from box (86a)	3455.09	×	1.150	=	3973.35
Energy for water heating (87b*) × 100 ÷ (104) =	N/A	×	N/A	=	N/A
Space and water heating					15796.90
Energy for water heating (Type 1 fraction) × (87*) × 100 ÷ (104a) =	N/A	×	N/A	=	N/A
Energy for water heating (Type 2 fraction) × (87*) × 100 ÷ (104b) =	N/A	×	N/A	=	N/A
Space and water heating				=	15796.90
Electricity for pumps and fans from box (87) or (88*)	175.00	×	2.800	=	490.00
Energy for lighting from Appendix L	356.13	×	2.800	=	997.16
Energy produced or saved in dwelling (Appendices M and N)					
PV energy produced or saved	(95) or (95*)	×	2.80	=	7680.56
Wind energy produced or saved	(95b1) or (95b1*)	×	N/A	=	N/A
Micro-CHP energy produced or saved	(95c1) or (95c1*)	×	N/A	=	N/A
Micro-CHP energy consumed	(96) or (96*)	×	N/A	=	0.00
Energy produced or saved in dwelling (Appendix Q)	(s1) or (s1*)	×	N/A	=	0.00
Energy consumed by the above technology (Appendix Q)	(s2) or (s2*)	×	N/A	=	0.00
Primary energy kWh/year					9603.51
Primary energy kWh/m²/year					125.40

Space heating from CHP or recovered/geothermal heat, box (86*)	N/A	×	N/A	box (107*) =	N/A
Space heating from boilers (87*) × 100 ÷ (109*) =	N/A	×	N/A	Table 12 =	-1.00
Electricity for pumps and fans, box (88*)	N/A	×	N/A	Table 12 =	N/A
Total PE associated with boilers, CHP or recovered/geothermal heat *If negative, enter "0" in box (115*)*			[(108*) + (110*) + ... + (114*)] =		-1.00
Energy for lighting from Appendix L	356.13	×	2.80	Table 12 =	997.16
Energy produced or saved in dwelling (Appendix M)					
PV energy produced or saved (95*)		×	2.80	Table 12 =	7680.56
Wind energy produced or saved (95b1*)		×	N/A	Table 12 =	N/A

Appendix M (Energy from PV and Wind): As Built - Final

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Assessor Name	Mr Martin Gill (OCDEA)	**Assessor Number**	1756
Client			
Date Last Modified	30/03/2009		
Address	16 Willingham Way, Kingston Upon Thames, Surrey, KT1 3JA		

M1 - Electricity produced by PV

$0.80 \times kWp \times S \times Z_{pv}$ = **2743.06** kWh/year

used in box (95a) in main SAP worksheet

Where

S = annual solar radiation from Table H2 — **886** kWh/m²

$\mathbf{Z_{pv}}$ = overshading factor from Table H3 — **1.00**

Installed peak power of the PV unit (kWp) — **3.870** kWp

Output of module under radiation of 1 kW/m² at 25°C

Fuel Price - cost of energy produced or saved by PV

[β × normal electricity price] + [(1 - β) × exported electricity price]

[0.5 × **7.12**] + [(0.5) × **5.70**] = **6.41** p/kWh

Where

used in the calculation of box (95a) in main SAP worksheet

β = 0.50 (for all PV related SAP 2005-9.81calculations)

Proportion of generated electricity that is used directly within the dwelling

CO_2 emissions saved by PV

Emission factor for grid-displaced electricity from Table 12 — kg CO_2 per kWh

Energy produced or saved in dwelling - used in box (110) on main worksheet — **0.568**

NB the same factor is used for all electricity generated, whether used within the dwelling or exported.

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M2 - Electricity Produced by wind turbines

$E_{wind} = N_{turbines}$ x 0.24 x 0.25 x pi x (Rotor Diameter)^2 x 0.6125 x (Average Wind Speed x Correction factor)^3 x 1.9 x 8766 x 0.001 = N/A kWh/year

used in box (95b) in main SAP worksheet

Where

$N_{turbines}$ = Number of wind turbines = N/A

1.9 = Wind speed variation function

8766 = Average number of hours per year

Fuel Price - cost of energy produced or saved by wind turbines

[β × normal electricity price] + [(1 - β) × exported electricity price]

[0.7 × N/A] + [(0.3) × N/A] = N/A p/kWh

Where

used in the calculation of box (95a) in main SAP worksheet

β = 0.70 (for all wind turbines related SAP 2005-9.81 calculations)

Proportion of generated electricity that is used directly within the dwelling

CO_2 emissions saved by wind turbines

Emission factor for grid-displaced electricity from Table 12 kg CO_2 per kWh

Energy produced or saved in dwelling - used in box (110) on main worksheet N/A

NB the same factor is used for all electricity generated, whether used within the dwelling or exported.

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Client

Date Last Modified 30/03/2009

Address 16 Willingham Way, Kingston Upon Thames, Surrey, KT1 3JA

Property type:	House
Built form:	End terrace
Flat type:	N/A
Year built:	1968
Region:	Thames
Number of sheltered sides:	1
Terrain:	Low rise U/S

Storeys:

Name	Basement	Area		Height
Lowest floor	No	38.24 m²		2.34 m
+1	No	38.34 m²		2.65 m
	Living room area =	15.30 m²	**Area Fraction =**	0.20

Floors:

Name	Type	Construction	Sealed	Area	Zone 1	U-value
Floor 1	Ground	Solid ground floor	N/A	38.24 m²	15.30 m²	0.79 W/m²K

Walls:

Name	Construction	Basement	Area	U-value
Wall 1	Timber	No basement present	87.62 m²	0.80 W/m²K

Roofs:

Name	Construction	Area	Zone1 Area	U-value
Roof 1	Pitched (joists)	38.24 m²	0.00 m²	0.15 W/m²K

Opening Ref: 1

Type	Window	**Master:**	No		
From source:	Table 6x (SAP 2005)	**Linked to:**	0		
Description:	kitchen	**Location name:**	Wall 1		
Frame:	u-PVC	**Width:**	1.48 m	**Transmittance:**	0.76
Thermal break:	N/A	**Height:**	1.08 m	**Fraction glazed:**	0.70
Draught proofing:	Loose seal	**Area:**	1.60 m²	**U-value:**	2.70 W/m²K
Metal lintel:	No	**Overhang depth:**	0.00 m		
Glazing Type:	Double	**Overhang width:**	0.00 m		
Argon Filled:	No				
Gap:	16mm or more				
Orientation:	East				
Overshading:	Average / Unknown				

Opening Ref: 2

Type	Window	**Master:**	No		
From source:	Table 6x (SAP 2005)	**Linked to:**	0		
Description:	master bed	**Location name:**	Wall 1		
Frame:	u-PVC	**Width:**	1.48 m	**Transmittance:**	0.76
Thermal break:	N/A	**Height:**	1.08 m	**Fraction glazed:**	0.70
Draught proofing:	Loose seal	**Area:**	1.60 m²	**U-value:**	2.70 W/m²K
Metal lintel:	No	**Overhang depth:**	0.00 m		
Glazing Type:	Double	**Overhang width:**	0.00 m		
Argon Filled:	No				
Gap:	16mm or more				
Orientation:	East				
Overshading:	Average / Unknown				

Opening Ref: 3

Type	Window	**Master:**	No		
From source:	Table 6x (SAP 2005)	**Linked to:**	0		
Description:	bed rear	**Location name:**	Wall 1		
Frame:	u-PVC	**Width:**	1.48 m	**Transmittance:**	0.76
Thermal break:	N/A	**Height:**	1.08 m	**Fraction glazed:**	0.70
Draught proofing:	Loose seal	**Area:**	1.60 m²	**U-value:**	2.70 W/m²K
Metal lintel:	No	**Overhang depth:**	0.00 m		
Glazing Type:	Double	**Overhang width:**	0.00 m		
Argon Filled:	No				
Gap:	16mm or more				
Orientation:	West				
Overshading:	Average / Unknown				

Opening Ref: 4

Type	Window	**Master:**	No		
From source:	Table 6x (SAP 2005)	**Linked to:**	0		
Description:	living room	**Location name:**	Wall 1		
Frame:	u-PVC	**Width:**	1.48 m	**Transmittance:**	0.76
Thermal break:	N/A	**Height:**	2.05 m	**Fraction glazed:**	0.70
Draught proofing:	Loose seal	**Area:**	3.03 m²	**U-value:**	2.70 W/m²K
Metal lintel:	No	**Overhang depth:**	0.00 m		
Glazing Type:	Double	**Overhang width:**	0.00 m		
Argon Filled:	No				
Gap:	16mm or more				
Orientation:	West				
Overshading:	Average / Unknown				

Opening Ref: 5

Type	Window	**Master:**	No		
From source:	Table 6x (SAP 2005)	**Linked to:**	0		
Description:	bath and T	**Location name:**	Wall 1		
Frame:	u-PVC	**Width:**	1.48 m	**Transmittance:**	0.76
Thermal break:	N/A	**Height:**	0.45 m	**Fraction glazed:**	0.70
Draught proofing:	Loose seal	**Area:**	0.67 m²	**U-value:**	2.70 W/m²K
Metal lintel:	No	**Overhang depth:**	0.00 m		
Glazing Type:	Double	**Overhang width:**	0.00 m		
Argon Filled:	No				
Gap:	16mm or more				
Orientation:	East				
Overshading:	Average / Unknown				

Opening Ref: 6

Type	Window	**Master:**	No		
From source:	Table 6x (SAP 2005)	**Linked to:**	0		
Description:	living room	**Location name:**	Wall 1		
Frame:	u-PVC	**Width:**	1.48 m	**Transmittance:**	0.76
Thermal break:	N/A	**Height:**	2.05 m	**Fraction glazed:**	0.70
Draught proofing:	Loose seal	**Area:**	3.03 m²	**U-value:**	2.70 W/m²K
Metal lintel:	No	**Overhang depth:**	0.00 m		
Glazing Type:	Double	**Overhang width:**	0.00 m		
Argon Filled:	No				
Gap:	16mm or more				
Orientation:	West				
Overshading:	Average / Unknown				

Opening Ref: 7

Type	Door	**Master:**	No		
From source:	Table 6x (SAP 2005)	**Linked to:**	0		
Description:	front door	**Location name:**	Wall 1		
Frame:	Wood	**Width:**	0.87 m	**Transmittance:**	0.85
Thermal break:	N/A	**Height:**	1.98 m	**Fraction glazed:**	0.40
Draught proofing:	Loose seal	**Area:**	1.72 m²	**U-value:**	3.90 W/m²K
Metal lintel:	No	**Overhang depth:**	-1.00 m		
Glazing Type:	Single	**Overhang width:**	-1.00 m		
Orientation:	East				
Overshading:	More than average				

Opening Ref: **8**

Type	Window	**Master:**	No		
From source:	Table 6x (SAP 2005)	**Linked to:**	0		
Description:	hall	**Location name:**	Wall 1		
Frame:	Wood	**Width:**	0.64 m	**Transmittance:**	0.85
Thermal break:	N/A	**Height:**	1.98 m	**Fraction glazed:**	0.40
Draught proofing:	Unopenable	**Area:**	1.27 m²	**U-value:**	4.80 W/m²K
Metal lintel:	No	**Overhang depth:**	0.00 m		
Glazing Type:	Single	**Overhang width:**	0.00 m		
Orientation:	East				
Overshading:	Average / Unknown				

Thermal bridging:

Detailed thermal bridges calculation:	No
'y' value type:	0.15 default 'y' value used
User defined 'y' value:	N/A
'y' value calculation method:	N/A

Air permeability:

Air permeability entered:	Yes		
Seek exemption for <3 dwellings:	No		
Design air permeability rate:	7.28	m³/hm² (@50Pa)	
As built air permeability rate:	7.28	m³/hm² (@50Pa)	As Tested
As built reference:	Bindt Cert 17265		
As built test date:	On or after 1 Nov 2007		
Mechanical ventilation:	Not present (natural)		
Number of fireplaces:	0		
Number of flues:	0		
Number of flueless gas fires:	0		
Number of fans and vents:	2		
Air Conditioning present?:	No		

Main heating:

Electricity Tariff:	Standard
Main heating type:	Boiler
Efficiency from:	Boiler efficiency database
Boiler Efficiency Database details:	
Index:	008440
Manufacturer:	Baxi Potterton
Model:	Performa
Boiler type:	Combi
Fuel:	Mains gas
Fan flue:	Yes
Main heating system:	1998 or later - Combi, auto ignition
Controls:	Programmer, room thermostat and TRV's

Emitter:	Radiators
Boiler Interlock:	Yes
Compensator:	N/A
Pump in heated space:	Yes
Main heating efficiency:	78.60 %

Community heating CHP:

Is there CHP:	N/A

Secondary heating system:

Secondary heating present:	No
Open flue or chimney present:	No

A secondary heating system is defaulted by the software for calculating the DER, in accordance with the building regulations.

Water heating:

Water heating type:	From main
Cylinder within dwelling:	N/A
Water heating fuel:	Mains gas
Water heating separately timed:	N/A

Solar water heating:

Solar water heating:	No

Photovoltaics (PV):

Photovoltaics:	Yes
Installed peak power (kWp):	3.87
Collector orientation:	East/West
Collector tilt:	30 degrees
Overshading:	None or very little < 20%

Wind turbines:

Wind turbines:	No

Additional allowable generation:

Is there additional Electricity generation:	No

Low energy lighting:

Low energy lights:	100.00 % of fixed lighting outlets (30% assumed for DER calculation)

External lighting:

Assess external lighting:	No
Fiitings only accept > 40 lumens per circuit watt:	N/A
Lamps not > 150W, off in day and at night when not needed:	N/A

Summer overheating:

Summer overheating included:	Yes
Cross ventilation on most floors:	Yes
Window ventilation:	Fully open half the time
Internal partition construction:	Plasterboard, timber/steel frame
Separating (party) wall construction:	Plasterboard, timber/steel frame
Curtains closed in daylight hours:	No
Fraction curtains closed:	N/A
Blind/curtain type:	N/A

Separated heated conservatory:

Heated conservatory present:	No

Special features:

Special features included:	No